

WHAT IS CLAIMED IS:

1. A high pressure discharge lamp starter device comprising:

a starter circuit capable of starting up an
5 essentially mercury free high pressure discharge lamp
containing a rare gas and a metal halide; and

control means

which allows the starter circuit to start up the
high pressure discharge lamp and to supply a lamp power
10 larger than twice a rated lamp power; and

which controls the starter circuit to reduce the
lamp power such that the light output is not
significantly larger than that of a stable light-
emission time and the light output does not rapidly
15 increase, when a metal halide charged in the high
pressure discharge lamp is abruptly vaporized;

and thereafter gradually reduce the lamp power so
as to settle at the rated lamp power.

2. A high pressure discharge lamp starter device
20 comprising

a starter circuit capable of starting up an
essentially mercury free high pressure discharge lamp
containing a rare gas and a metal halide; and

control means which controls the starter circuit
25 to supply lamp power to the high pressure discharge
lamp in such a manner that

a first lamp power larger than twice a rated lamp

power is supplied during a first time zone,

a second lamp power is supplied during a second time zone, the second lamp power being reduced at a reduction rate of 1 to 8W/second from the first lamp power, and

a third lamp power is supplied during a third time zone, the third lamp power being gradually reduced from the second lamp power to the rated lamp power,

where the first time zone is defined as the time of 1 to 20 seconds immediately after the startup of the high pressure discharge lamp;

the second time zone is defined as the time set within 0.4 to 9 seconds following the first time zone; and

the third time zone is defined as the time following the second time zone and within 40 to 70 seconds immediately after the startup.

3. The high pressure discharge lamp starter device according to claim 2, wherein the control means comprises

a target lamp power setup circuit which previously stores

the first target lamp power, which is larger than twice the rated lamp power of the high pressure discharge lamp, to be supplied in the first time zone,

the second target lamp power, which is reduced at a reduction rate of 1 to 8W/second with the passage of

time from the first target lamp power, to be supplied
in the second time zone, and

the third target lamp power, which is gradually
reduced from the second target lamp power to the rated
5 lamp power, to be supplied in the third time zone;

a light-emission time measuring timer which
measures the light-emission time of the high pressure
discharge lamp and outputs a target lamp power from the
target lamp power setting circuit in accordance with
10 the light-emission time;

actual lamp power detection means which detects an
actual lamp power supplied to the high pressure
discharge lamp; and

lamp power regulation means which compares the
15 target lamp power with the actual lamp power and
regulates the actual lamp power in accordance with the
difference between the target lamp power and the actual
lamp power.

4. The high pressure discharge lamp starter
20 device according to claim 3, wherein the control means
comprises turn-on detection means which detects turn-on
of the high pressure discharge lamp and initiates the
emission time measuring timer to measure emission time
when the turn-on is detected.

25 5. The high pressure discharge lamp starter
device according to claim 1, wherein the control means
comprises

a target lamp power setup circuit configured to store a first target lamp power, which is to be supplied in a first time zone and which is larger than twice a rated lamp power of the high pressure discharge lamp, and to store a second target lamp power, which is to be supplied in a second time zone, and which is gradually reduced from the first target lamp power with the passage of time,

where the first time zone is defined from the startup to the time at which a metal halide charged in the high pressure discharge lamp abruptly vaporizes, and the second time zone is defined as the one continued from the first time zone and set within the range of 40 to 70 seconds immediately after the startup;

a light-emission time measuring timer which measures the time from the startup to turn-on of the high pressure discharge lamp;

halide abrupt vaporization detection means which detects the time at which the metal halide charged in the high pressure discharge lamp abruptly vaporizes after the startup; and

turn-on detection means which detects the turn-on of the high pressure discharge lamp,

the light emission time measuring timer working in concert with turn-on detection means and the halide abrupt vaporization detection means

to allow the target lamp power setup circuit
to output the first target lamp power when the
turn-on detection means detects the turn-on of the high
pressure discharge lamp;

5 to output the second target lamp power by
switching the time zone to the second time zone, when
the halide abrupt vaporization detection means detects
the abrupt vaporization of a metal halide; and
thereafter,

10 to output target lamp power depending upon light
emission time.

6. The high pressure discharge lamp starter
device according to claim 5, wherein the halide abrupt
vaporization detection means detects the abrupt
15 vaporization of a halide by monitoring at least the
voltage corresponding to the lamp voltage of the high
pressure discharge lamp.

7. A high pressure discharge lamp starter device
comprising:

20 a starter circuit capable of starting up an
essentially mercury free high pressure discharge lamp
containing a rare gas and a metal halide; and

control means

which allows the starter circuit

25 to start up the high pressure discharge lamp and
supply a lamp power larger than twice a rated lamp
power

which determines as to whether the lamp power should be gradually reduced or not; and

which controls the starter circuit to gradually decrease the lamp power so as to settle the rated lamp power while almost continuously increasing lamp voltage.

8. A high pressure discharge lamp starter device comprising

a starter circuit capable of starting up an essentially mercury free high pressure discharge lamp containing a rare gas and a metal halide; and

control means which controls the starter circuit to start up the high pressure discharge lamp and supply a lamp power larger than twice a rated lamp power from the starter circuit,

to determine as to whether the lamp power should be reduced or not based on the light emission state of the high pressure discharge lamp when the lamp power is reduced in the state that the light amount of the high pressure discharge lamp is smaller than that during the stable time, and

to gradually reduce the lamp power so as to settle at the rated lamp power when it is determined that the lamp power should be decreased,

or increase and return the lamp power to the level before the lamp power is reduced, when it is determined that the lamp power should not be reduced.

9. The high pressure discharge lamp starter device according to claim 8, wherein the determination as to whether the lamp power should be reduced or not is made based on an increase or decrease of the lamp voltage.

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10. The high pressure discharge lamp starter device according to any one of claims 1 to 9, further comprising an essentially mercury free high pressure discharge lamp containing a rare gas and a metal halide.

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11. An automotive headlight device comprises an automotive headlight device main body and the high pressure discharge lamp starter device according to claim 10 arranged in the automotive headlight device main body.

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